Electronic Version
Stylesheet Version v1.1.1

Claims

[c1] 1. A charge-pump circuitry, receiving an external voltage source to generate a target voltage, comprising:
a voltage multiplier module, comprising an input terminal and an output terminal, wherein the output terminal comprises a first terminal and a second terminal, the input terminal receives the external voltage source, the voltage multiplier module generates a multiplied-voltage on the first terminal and the second terminal according to the external voltage source, and the multiplied-voltage is a predetermined times of a voltage potential of the external voltage source;
a voltage difference generating circuitry for generating a correcting voltage, wherein an output terminal of the voltage difference generating circuitry electrically couples to the second terminal in the output terminal of the voltage multiplier module, and a voltage potential of the correcting voltage is a potential difference between the target voltage and the multiplied-voltage; and
a first capacitor, wherein one terminal of the first capacitor electrically couples to the first terminal in the output terminal of the voltage multiplier module, and the other terminal is grounded.

[c2] 2. The charge-pump circuitry of claim 1, wherein the voltage difference generating circuitry comprises:
an operational amplifier, comprising an negative signal input terminal, a positive signal input terminal, and an output terminal, wherein the positive signal input terminal receives a reference voltage, and the output terminal electrically couples to the second input terminal;
a first resistor, wherein one terminal of the first resistor electrically couples to the negative signal input terminal, and the other terminal receives the external voltage source;
a second resistor, wherein one terminal of the second resistor electrically couples to the negative signal input terminal, and the other terminal is grounded; and
a third resistor, wherein one terminal of the third resistor electrically couples to the negative signal input terminal, and the other terminal electrically couples to the output terminal.

[c3] 3. The charge-pump circuitry of claim 1, wherein the voltage multiplier module comprises:
a first switch circuit, comprising a 1^{st} terminal, a 2^{nd} terminal, a 3^{rd} terminal, and a 4^{th} terminal, wherein the 1^{st} terminal receives the external voltage source, and the 2^{nd} terminal is grounded;
a second capacitor, wherein one terminal of the second

capacitor electrically couples to the 3rd terminal, and the other terminal electrically couples to the 4th terminal; and

a second switch circuit, comprising a 5th terminal, a 6th terminal, a 7th terminal, and an 8th terminal, wherein the 5th terminal electrically couples to the 3rd terminal, the 6th terminal electrically couples to the 4th terminal, and the 7th terminal and the 8th terminal are the output terminal; wherein, the first switch circuit determines whether to have the external voltage source pass through to charge the second capacitor, and the second switch circuit determines whether to have the target voltage pass through to charge the first capacitor.

[c4] 4. The charge-pump circuitry of claim 3, wherein the voltage potential of the target voltage is a summation of a potential stored in the second capacitor and the voltage potential of the correcting voltage.

[c5] 5. The charge-pump circuitry of claim 4, wherein the first switch circuit comprises:

a first dual port switch, wherein one terminal of the first dual port switch is the 1st terminal, and the other terminal of the first dual port switch is the 3rd terminal; and

a second dual port switch, wherein one terminal of the second dual port switch is the 2nd terminal, the other terminal of the second dual port switch is the 4th termi-

nal, and the first dual port switch and the second dual port switch determine whether to have the external voltage source pass through to charge the second capacitor.

[c6] 6. The charge-pump circuitry of claim 5, wherein the second switch circuit comprises:
a third dual port switch, wherein one terminal of the third dual port switch is the 5^{th} terminal, and the other terminal of the third dual port switch is the 7^{th} terminal; and
a fourth dual port switch, wherein one terminal of the fourth dual port switch is the 6^{th} terminal, the other terminal of the fourth dual port switch is the 8^{th} terminal, and the third dual port switch and the fourth dual port switch determine whether to have the target voltage source pass through to charge the first capacitor.

[c7] 7. The charge-pump circuitry of claim 6, wherein a "turn-on" and "turn-off" cycle of the first dual port switch and the second dual port switch is referred as a first clock cycle, a "turn-on" and "turn-off" cycle of the third dual port switch is referred as a second clock cycle, a "turn-on" and "turn-off" cycle of the fourth dual port switch is referred as a third clock cycle, and during a duty cycle of the first clock cycle, the second clock cycle, and the third clock cycle, the first dual port switch, the second dual port switch, the third dual port switch, and the fourth

dual port switch are turned on.

[c8] 8. The charge-pump circuitry of claim 7, wherein the duty cycle of the first clock cycle is not overlapped with the duty cycle of the second clock cycle, and the duty cycle of the first clock cycle is not overlapped with the duty cycle of the third clock cycle, neither.

[c9] 9. The charge-pump circuitry of claim 8, wherein the duty cycle of the third clock cycle leads the duty cycle of the second clock cycle a certain period of time.

[c10] 10. The charge-pump circuitry of claim 4, wherein the first switch circuit comprises:
a first dual port switch, wherein one terminal of the first dual port switch is the 1^{st} terminal, and the other terminal of the first dual port switch is the 3^{rd} terminal; and
a second dual port switch, wherein one terminal of the second dual port switch is the 2^{nd} terminal, the other terminal of the second dual port switch is the 6^{th} terminal, and the first dual port switch and the second dual port switch determine whether to have the external voltage source pass through to charge the second capacitor.

[c11] 11. The charge-pump circuitry of claim 10, wherein the second switch circuit comprises:
a third dual port switch, wherein one terminal of the

third dual port switch is the 5th terminal, and the other terminal of the third dual port switch is the 7th terminal; and

a fourth dual port switch, wherein one terminal of the fourth dual port switch is the 4th terminal, the other terminal of the fourth dual port switch is the 8th terminal, and the third dual port switch and the fourth dual port switch determine whether to have the target voltage source pass through to charge the first capacitor.

[c12] 12. The charge-pump circuitry of claim 11, wherein a "turn-on" and "turn-off" cycle of the first dual port switch and the second dual port switch is referred as a first clock cycle, a "turn-on" and "turn-off" cycle of the third dual port switch is referred as a second clock cycle, a "turn-on" and "turn-off" cycle of the fourth dual port switch is referred as a third clock cycle, and during a duty cycle of the first clock cycle, the second clock cycle, and the third clock cycle, the first dual port switch, the second dual port switch, the third dual port switch, and the fourth dual port switch are turned on.

[c13] 13. The charge-pump circuitry of claim 12, wherein the duty cycle of the first clock cycle is not overlapped with the duty cycle of the second clock cycle, and the duty cycle of the first clock cycle is not overlapped with the duty cycle of the third clock cycle, neither.

[c14] 14. The charge-pump circuitry of claim 13, wherein the duty cycle of the second clock cycle leads the duty cycle of the third clock cycle a certain period of time.